

reason I publish it. I have upon numerous occasions observed the momentary expulsion of spores from fungi such as *Bulgaria rufa* and *Sarcoscypha floccosa*, but with these plants the spore-discharge seems to occur when they are first touched, and then only.

C. C. HANMER.

EAST HARTFORD, CONN.,
July 27, 1905.

REVIEWS

Mutants and Hybrids of the *Oenotheras**

The literature of mutation grows apace. One of the latest contributions to the subject is a publication of the Carnegie Institution of Washington with the above title. The work is copiously illustrated with many fine half-tone plates and cuts. Professor MacDougal a year or two ago secured seeds of *Oenothera Lamarckiana* and several other mutants from Professor de Vries in Amsterdam. In a carefully guarded and securely enclosed experimental ground at the New York Botanical Garden experiments were instituted to determine the influence of American conditions on the mutants of *Oenothera* secured by de Vries. The results of the work of Professor MacDougal to date constitute the basis of the report herein reviewed.

It was deemed important to establish the original habitat of *Oenothera Lamarckiana* if practicable. During the visit of Professor de Vries to America in the summer of 1904, a visit was paid, in company with the reviewer, to the herbarium of the Philadelphia Academy of Sciences, where a sheet considered to be that of *Oenothera Lamarckiana* was found, the specimen having been collected by C. W. Short near Lexington, Kentucky. The interest of a number of southern botanists was elicited in the search for the plant, but up to the present no living wild plants of *Oenothera Lamarckiana* have been found. In connection with this search, Professor S. M. Tracy rediscovered *O. grandiflora* in the original locality of Bartram. These discoveries, coupled with

* MacDougal, D. T., assisted by Vail, A. M., Shull, G. H., and Small, J. K. Mutants and Hybrids of the *Oenotheras*. Carnegie Institution of Washington, Publication No. 24. 1905. Papers of Station for Experimental Evolution at Cold Spring Harbor, New York. No. 2.

the experiments described below, indicate that there are two groups of evening primroses in the eastern United States: (1) *O. biennis*, *O. muricata*, *O. Oakesiana* and *O. cruciata*, with comparatively small flowers, in which self-pollination is possible and frequent; (2) *O. argillicola*, *O. grandiflora*, and *O. Lamarckiana* of a southern range and with flowers large and accessory structures favorable to cross-pollination.

The experimental work consisted in growing *Oenothera biennis* in order to observe the changes produced by cultivation. Careful measurements of the plants were made, and it was further established that *O. biennis* is capable of self-fertilization by reason of the superior length of the stamens. A new wild species, *O. argillicola* Mackenzie, was tested and its distinctive characters demonstrated. *O. cruciata* (Nutt.) Small, also, was grown in the experimental grounds, and the evidence at hand seems to confirm the suggestion as to the mutability of the species. It was, therefore, found important by the experimenters, aided by the critical descriptive study of the experimental plants by Miss A. M. Vail and Dr. J. K. Small, to give the characters of the forms of this species secured. Professor MacDougal has also been careful to hybridize *O. Lamarckiana* and *O. cruciata*, as well as *O. Lamarckiana* and *O. biennis*, *O. Lamarckiana* and *O. muricata*, in order to determine by this analysis the relationships between *O. Lamarckiana* and other species of the genus. It was shown that the hybrid progeny in the cultures, made in the New York Botanical Garden and in Amsterdam, included a series of types which ranged, in the aggregate of characters included, from those representing pure strains of both parents through goneoclinic forms to intermediates in which parental characters were, more or less, equally apparent. The experiments show also that the hybrid *O. Lamarckiana* × *O. biennis* includes four distinct and separate forms, none of which is identical with the unilateral monotypic hybrid obtained in the same cross in Amsterdam. Attention was paid to the occurrence of mutants among the hybrids, and with a description of these the first part of the paper closes.

The second part of the publication is a statistical comparison of *Oenothera Lamarckiana* with two of its mutants by Dr. G. H.

Shull, which shows that some of the unit characters of the mutants have a much greater variability than the corresponding features of the parent form, and the greater amplitude of the fluctuations is coupled with a decreased correlation. Thus the coefficient of variability of *nanella* is 31.84 ± 3.16 per cent., while of *Lamarckiana* it is 5.37 ± 0.44 per cent. The greater variability of the mutants does not, however, seem to result in any diminution of the gap that separates them from the parent form, and no movement in this direction has been observed in the long period which has elapsed since the new species came into existence. A bibliography is added.

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PROCEEDINGS OF THE CLUB

WEDNESDAY, MAY 31, 1905

The meeting was held in the evening at the American Museum of Natural History, President Rusby in the chair and eleven persons present.

A report was received from President Rusby of the favorable action of the Council of the Scientific Alliance on Professor Richards' application for a grant from the Herrman fund. Attention was called also to the movement on the part of the Alliance toward raising a fund of \$10,000, the income of which would be used to lighten the present assessments of the individual societies.

A communication from Dr. A. J. Grout, President of the Hulst Botanical Club of Brooklyn, requesting that it be allowed to coöperate with the Torrey Club in the excursions was referred to the Field Committee with power.

The following were elected to membership: Miss Madeline Pierce, Miss Mary McOuat, Miss Anna M. Clark, Miss Clara K. Hicks, Mr. C. C. Doorly, and H. J. Goeckel, Phar.D., New York City; Miss Dorothy Young, Passaic, N. J.; and Norman Taylor, Yonkers, N. Y.

On motion, a resolution was adopted authorizing the member-